

## **Drought Flow Fact Sheet**

The Hydrologic Studies Unit (HSU) of the Land and Water Management Division (LWMD) of the Department of Environmental Quality estimates design drought streamflows that are used to administer some of the water quality programs in the DEQ and other state agencies.

Drought streamflow estimates are crucial for water quality management, issuing and/or renewing National Pollution Discharge Elimination System (NPDES) permits, subsurface cleaning efforts, planning water supplies, hydropower, irrigation systems, and for assessing the impact of prolonged droughts on aquatic ecosystems.

Drought flow estimates are based on long-term streamflow data collected at gaging stations operated by the United States Geological Survey (USGS). The USGS and the HSU collect streamflow measurements at numerous sites throughout the state every year.

Methods used to estimate drought flows include:

- Drainage Area Ratio (DAR). This method is used for gaged or ungaged watersheds. The drought flows at a specific site are computed based on the ratio of the drainage areas between that site and a USGS gaging station. A USGS station with similar watershed characteristics is used for this method.
- Correlation. This method is used for ungaged sites where some flow measurements have been made. The measurements are correlated with those for the corresponding time at a long-term USGS station. The correlation parameters are then used to modify the flows at the USGS station to be applicable to the ungaged site.
- Proration. This method is used when there is a drastic change in the geology between multiple USGS stations on the same stream. The flows are estimated based on a ratio of flows between the gages.
- Addition. This method is used when the site is in a watershed that has numerous point sources and/or water control structures such as dams, diversions, etc. Flows are estimated by one of the above methods, then the flows from various the point sources are added (or subtracted).

The following types of flows are provided to the different programs in the DEQ:

- The Water Bureau's NPDES program requires the 95 and 50 percent exceedance flows; the 90 consecutive days, once in ten year drought flow (90dQ10); and the harmonic mean.
- The Remediation and Redevelopment Division's Leaking Underground Storage Tank sites and Super Fund sites use the lowest 95% exceedance flow and the precipitation recharge rate.
- LWMD's Dam Safety Program uses the monthly 95% exceedance flow for dam repairs and water drawdown.
- Mean flows are also provided for inland lakes, fisheries, wildlife, and wetlands studies.